

Application No.: 10/026,171  
Response dated: March 25, 2008  
Reply to Office Action of: December 27, 2007

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**LISTING OF CLAIMS**

1. (Currently Amended) A method for preparing a supported catalyst composition system comprising:

(a) first heating a composition comprising a metallocene catalyst compound and an activator to a temperature of from 75°C to 125°C for about 30 minutes to about 3 hours,

wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof;

and

(b) then combining the resulting composition of step (a) with a carrier, said carrier heated to 30-75°C; wherein the composition of step (a) is at a temperature of from 75°C to 125°C and said carrier is at a temperature of 30-75°C when the composition of step (a) and the carrier are combined.

2. (Cancelled)
3. (Previously Presented) The method of claim 1 wherein in step (a) the composition is heated to a temperature in the range of from 75°C to 100°C.
4. (Cancelled)

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5. (Previously Presented) The method of claim 3 wherein the metallocene catalyst compound has a solubility less than 20 weight percent of metallocene catalyst compound in toluene at 25°C.
6. (Currently Amended) A method for making a supported catalyst composition comprising:
  - (a) first forming a reaction product comprising a metallocene catalyst compound and an activator;
  - (b) second heating the reaction product to a temperature of from 60°C to 125°C for about 30 minutes to about 3 hours;
  - (c) combining the resulting composition of steps (a) and (b) product with a carrier, wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different;

M is selected from the group consisting of zirconium, hafnium and titanium,

Q is a monoanionic labile ligand having a sigma-bond to M;

depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound;

A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof,

said carrier heated a temperature consisting essentially of 30-75°C; wherein the reaction product of step (b) is at a temperature of from 60°C to 125°C and said

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carrier is at a temperature of 30-75°C when the reaction product of step (b) and the carrier are combined.

7. (Original) The method of claim 6 wherein the reaction product is heated to a temperature in the range from 75°C to 100°C.
8. (Currently Amended) A method for making a supported catalyst composition comprising:

(a) a first step comprising heating an activated metallocene catalyst product to a temperature of from 60°C to 125°C for about 30 minutes to about 3 hours;

(b) a second step comprising combining a carrier with the activated metallocene catalyst product of step (a)

wherein said metallocene catalyst is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, and said activated metallocene catalyst product further comprising an activator, wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof, said carrier heated to 30-75°C; wherein the activated metallocene catalyst of step (a) is at a temperature of from 60°C to 125°C and said carrier is at a temperature of 30-75°C when the composition of step (a) and the carrier are combined.

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9. (Previously Presented) The method of claim 8 wherein the activated metallocene catalyst product is heated to a temperature of from 75°C to 100°C.
10. (Currently Amended) A method for preparing a supported catalyst composition comprising:
- (a) a first step comprising heating a composition comprising a metallocene catalyst compound and an activator to a temperature in the range of from 60°C to 110°C for about 30 minutes to about 3 hours; and
- (b) a subsequent step comprising combining said composition of step (a), and a carrier

wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof, said carrier heated to a temperature consisting essentially of 30-75°C; wherein the composition of step (a) is at a temperature of from 60°C to 110°C and said carrier is at a temperature of 30-75°C when the composition of step (a) and the carrier are combined.

11. (Cancelled)

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12. (Cancelled)
13. (Cancelled)
14. (Currently Amended) A method for preparing a supported catalyst composition comprising:
  - (a) forming a catalyst system comprising a metallocene catalyst compound and an activator at a temperature in the range of from 60°C to 125°C for about 30 minutes to about 3 hours; and
  - (b) subsequently introducing a further component comprising a carrier to a reaction product formed in step (a)

wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof, said carrier heated to 30-75°C; wherein the reaction product of step (a) is at a temperature of from 60°C to 125°C and said carrier is at a temperature of 30-75°C when the composition of step (a) and the carrier are combined.

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15. (Previously Presented) The method of claim 14 wherein the supported catalyst composition is subsequently dried or substantially dried to a free flowing powder composition.
16. (Original) The method of claim 15 wherein the free flowing composition is reslurried in a liquid.
17. (Original) The method of claim 16 wherein the liquid is mineral oil.
18. (Previously Presented) The method of claim 14 wherein the metallocene catalyst compound and activator are combined at a temperature of from 60°C to 110°C.
19. (Previously Presented) The method of claim 14 wherein the metallocene catalyst compound and activator are combined at a temperature of from 60°C to 100°C.
20. (Previously Presented) The method of claim 14 wherein the metallocene catalyst compound and activator are combined at a temperature of from 75°C to 100°C.
21. (Currently Amended) A method for preparing a supported catalyst composition comprising:
  - a) combining a metallocene catalyst compound and an activator at a temperature in the range of from 60°C to 110°C for about 30 minutes to about 3 hours; and
  - b) introducing a carrier to a reaction product formed in step (a)

wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecenc ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozoilyl ligands, carbazoyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group

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consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof, said carrier heated to 30-75°C; wherein said metallocene catalyst compound and said activator of step (a) is at a temperature of from 60°C to 110°C and said carrier is at a temperature of 30-75°C, when the metallocene catalyst compound and the activator of step (a) and the carrier are combined.

22. (Previously Presented) The method of claim 21, wherein the metallocene catalyst compound and activator are combined at a temperature of from 75°C to 100°C.
23. (Cancelled)
24. (Previously Presented) The method of claim 21, wherein  $L^A$  and  $L^B$ , are tetrahydroindenyl ligands; A is represented by a member of the group consisting of  $R'_2C$ ,  $R'_2Si$ ,  $R'_2Si R'_2Si$ ,  $R'_2Ge$ , and  $R'_2P$ , where each  $R'$  is independently, a hydride, hydrocarbyl, substituted hydrocarbyl, halocarbyl, substituted halocarbyl, hydrocarbyl-substituted organometalloid, halocarbyl-substituted organometalloid, disubstituted boron, disubstituted pnictogen, substituted chalcogen, or halogen or two or more  $R'$  may be joined to form a ring or ring system, and wherein said Q is selected from the group consisting of hydrocarbyl radicals having from 1 to 20 carbon atoms, and halogens.
25. (Previously Presented) The method of claim 24, wherein said A is  $R'_2Si$ , where  $R'$  is hydrocarbyl; and M is zirconium.
26. (Previously Presented) The method of claim 1, wherein said metallocene catalyst compound comprises one of dimethylsilyl-bis (tetrahydroindenyl) zirconium dichloride or dimethylsilyl-bis (tetrahydroindenyl) zirconium difluoride.
27. (Currently Amended) A method for making a supported catalyst composition comprising:

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- a) first forming a reaction product formed from a metallocene catalyst compound and an activator, wherein said metallocene catalyst compound comprises one of dimethylsilyl-bis(tetrahydroindenyl) zirconium dichloride or dimethylsilyl-bis(tetrahydroindenyl) zirconium difluoride;
- b) second heating the reaction product to a temperature of from 60°C to 125°C for about 30 minutes to about 3 hours;
- c) then combining a carrier with said reaction product of steps (a) and (b); and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof, said carrier heated to 30-75°C; wherein said reaction product of step (a-b) is at a temperature of from 60°C to 125°C and said carrier is at a temperature of 30-75°C when the reaction product of step (b) and the carrier are combined..
28. (Currently Amended) A method for making a supported catalyst composition comprising:
- a) first forming a reaction product comprising a metallocene catalyst compound and an activator, wherein said metallocene catalyst compound consists essentially of one of dimethylsilyl-bis(tetrahydroindenyl) zirconium dichloride, and dimethylsilyl-bis(tetrahydroindenyl) zirconium difluoride;
- b) second heating the reaction product to a temperature of from 60°C to 125°C for about 30 minutes to about 3 hours; and
- c) then introducing a carrier, to said reaction product of steps (a) and (b); and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof, said carrier heated to 30-75°C; wherein said reaction product of step (b) is at a temperature of from 60°C to 125°C and said carrier is at a temperature of 30-75°C when the reaction product of step (b) and the carrier are combined.
29. (Currently Amended) A method for making a supported catalyst composition comprising:



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- a) first forming a reaction product comprising methyl alumoxane and one of dimethylsilyl-bis(tetrahydroindenyl) zirconium dichloride or dimethylsilyl-bis(tetrahydroindenyl) zirconium difluoride;
  - b) second heating the reaction product, to a temperature consisting essentially of from 60°C to 125°C for about 30 minutes to about 3 hours; and
  - c) then combining a carrier with said reaction product of steps (a) and (b), said carrier heated to 30-75°C; wherein said reaction product of step (b) is at a temperature of from 60°C to 125°C and said carrier is at a temperature of 30-75°C when the reaction product of step (b) and the carrier are combined.
30. (Currently Amended) A method for making a supported catalyst composition, comprising:
- (c) (a) first heating a composition comprising an activated metallocene catalyst compound to a temperature of from 65°C to 125°C for about 30 minutes to about 3 hours,

wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrozolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, and further comprising an activator, said activated metallocene catalyst compound further

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comprising an activator, wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof;

and

(b) then combining said composition of (a) at a temperature of from 65°C to 125°C with a carrier, said carrier being at a temperature of 30-75°C, to form said supported catalyst composition.

31. (Previously Presented) The method of claim 30, wherein said heating of said activated metallocene catalyst compound is from 68-100°C.
32. (Previously Presented) The method of claim 30, wherein said heating of said activated metallocene catalyst compound is from 75-100°C.
33. (Previously Presented) The method of claim 30, wherein said method further comprises: after a) and b) , (c) then drying said supported catalyst composition at a temperature of from 65°C-75°C.
34. (Currently Amended) A method for making a supported catalyst composition, comprising:
- (a) first forming a reaction product of a metallocene catalyst compound and an activator, wherein said metallocene catalyst compound comprises one of dimethylsilyl-bis(tetrahydroindenyl) zirconium dichloride or dimethylsilyl-bis(tetrahydroindenyl) zirconium difluoride;
- b) second heating the reaction product to a temperature of from 65°C to 75°C for about 30 minutes to about 3 hours;
- [[b)] c) then combining said reaction product of (b) with a carrier, said carrier heated to 65-75°C, to form said supported catalyst composition; wherein said reaction product of step (b) is at a temperature of from 65°C-75°C and said carrier is at a temperature of 65-75°C when combined.
35. (Currently Amended) A method for making a supported catalyst composition, comprising:

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(a) first forming a reaction product of an activator and a metallocene catalyst compound, then heating said reaction product to a temperature of from 65°C to 75°C for about 30 minutes to about 3 hours;

wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof;

(b) then combining said reaction product of (a) with a carrier, said carrier heated to 30-75°C, to form said supported catalyst composition; wherein said reaction product of step (a) is at a temperature of from 65°C to 75°C and said carrier is at a temperature of 30-75°C when combined; and

(c) then drying said supported catalyst composition at a temperature of from 65°C-75°C.

36. (Previously Presented) A method for making a supported catalyst composition, comprising:

(a) first forming a reaction product of an activator and a metallocene catalyst compound, then heating said reaction product to a temperature of from 80°C to 100°C for a time period of about 30 minutes to about 3 hours;

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wherein said metallocene catalyst compound is described by the formula:



wherein  $L^A$  and  $L^B$  are selected from the group consisting of cyclopentadienyl ligands, cyclopentaphenanthrenyl ligands, indenyl ligands, benzindenyl ligands, fluorenyl ligands, octahydrofluorenyl ligands, cyclooctatetraendiyl ligands, cyclopentacyclododecene ligands, azenyl ligands, azulene ligands, pentalene ligands, phosphoyl ligands, phosphinimine, pyrrolyl ligands, pyrolyl ligands, carbazolyl ligands, and borabenzene ligands, including hydrogenated versions thereof; independently, each  $L^A$  and  $L^B$  is the same or different; M is selected from the group consisting of zirconium, hafnium and titanium, Q is a monoanionic labile ligand having a sigma-bond to M; depending on the oxidation state of M, the value for n is 0, 1 or 2 such that the catalyst compound comprises a neutral metallocene catalyst compound; A is a bridging group comprising a carbon, oxygen, nitrogen, silicon, aluminum, boron, germanium or tin atom or a combination thereof, and wherein said activator is an alumoxane; a modified alumoxane; ionizing activators, neutral or ionic; or combinations thereof;

(b) then combining said reaction product of (a) with a carrier, said carrier heated to 30-75°C, wherein said combined reaction product of (a) and said carrier are heated at 30-75°C for a time period of about 30 minutes to about 3 hours, to form said supported catalyst composition; wherein said reaction product of step (a) is at a temperature of from 65°C to 75°C and said carrier is at a temperature of 30-75°C when combined.

37. (Previously Presented) The method of claim 36, wherein said metallocene catalyst compound comprises one of dimethylsilyl-bis (tetrahydroindenyl) zirconium dichloride or dimethylsilyl-bis (tetrahydroindenyl) zirconium difluoride.
38. (Previously Presented) The method of Claim 37, wherein the activator comprises an alumoxane or a modified alumoxane.